Software Conformance Testing by NIST/ITL

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Definitions: "**conformity** - fulfillment by a product, process or service of specified requirements."

"**conformity evaluation** - systematic examination of the extent to which a product, process or service fulfils specified requirements."

"**conformity testing** - conformity evaluation by means of testing." ISO/IEC Guide 2

ITL Conformance Testing Strategy

- Build on traditional expertise in conformance testing (ITL developed or assisted in developing test suites for C, COBOL, Fortran, Ada, POSIX, and SQL)

- Focus on testing and measurement to expedite the research, development, standardization, and commercialization of new technologies

- Emphasize developing tests that can be used earlier in the technology cycle to help developers

- Facilitate international recognition and acceptance of test results

Examples of Conformance Testing Projects

- ITL has developed diagnostic tools and conformance tests for the Virtual Reality Modeling Language (VRML)
  http://www.nist.gov/itl/div897/projects/projvrml.html

- ITL has produced conformance tests related to computer security
  Data Encryption Standard (DES)
  Digital Signature Standards (DSS)
  Secure Hash Algorithm (SHS)
  http://csrc.nist.gov/cryptval

Examples of Conformance Testing Projects (cont)

- ITL is working with the conformance testing task group for XML to assist in developing XML tests

- ITL is using this XML expertise to assist EDUCAUSE's Instructional Management Systems (IMS) Project http://www.imsproject.org/

- ITL is developing a set of statistical tests to assess the randomness bitstreams as produced by cryptographic pseudo-random number generators

- ITL is working with industry to develop JAVA realtime measurements

Research and Development Efforts

- ITL has initiated several projects to improve the quality and and timeliness of software testing and measurement

- ITL has devised a methodology and supporting tools to enable the testing of distributed collaborative environments

- ITL has initiated a project to apply statistical methods to derive quantitative measures of software correctness or quality

- ITL is evaluating whether formal methods can be used for generating tests for software development

Technical and Conceptual Issues for IT Measurements and Testing

Does physical measurement theory apply to IT?

What is the correspondence of testing and measurement?

How can the confidence of test results be quantified?

What assurance can ‘good enough testing’ provide?

How can the development time and costs be reduced for tests?